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THE POISONING OF LIVESTOCK WHILE FEEDING ON PLANTS OF THE SORGHUM GROUP

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In a previous publication* of this Station some details were given concerning the poisoning of livestock while in pasture. The number of cattle killed in this way in Oklahoma each year is very large. No doubt in many instances the death of the animal is due to improper feeding and to feed which has been damaged.

In many cases farm animals die suddenly after exhibiting strange symptoms, and under such circumstances the owner often suspects poisoning; sometimes malicious poisoning is suspected. A large number of sudden deaths have been studied in this department, but the records show only one case of a foreign poison being found in the stomach of an animal, and upon investigation the accidental presence of mineral poisons in the feed was explained.

Several causes of sudden death of livestock have been recognized. Among these may be mentioned excessive feeding, sudden change in the character of a feed, feed upon which mold has developed. Growths such as ergot and oat smut are especially dangerous.

All feed should be fully cured, that is, practically free from moisture, for more feed is lost, or partially spoiled, each year owing to the lack of this precaution than in any other way. The presence of water causes heating and the development of the poisonous molds previously mentioned.

It has been known for some time that some plants under certain conditions of growth are liable to cause death. Corn, sorghum cane, the grain sorghums and Johnson grass have been known to cause fatal effects in many cases. This form of poisoning has been studied by the Oklahoma Agricultural Experiment Station, and the results are presented here in response to numerous inquiries for information on the subject.

A careful survey of cornstalk poisoning was made several years ago by the Nebraska Agricultural Experiment Station.** The investigation demonstrated that animals often die suddenly, apparently poisoned, regardless of the character of feed. In Table I is shown the information furnished by over four hundred farmers who had lost cattle.

*Oklahoma Agricultural Experiment Station Twenty-Second Annual Report, 1912-13.
**Alway and Peters, Bulletin No. 27, 1908.

TABLE I

Number of Cattle Dying While Feeding on Cornstalks and Other Feeds

Feed Given in Addition to Cornstalk Pasture	Reports	Cattle Lost	Cattle Pastured	Acres Pastured	Cattle Lost per 100 Head	Loss per 1,000 Acres Pastured
None	113	464	5,689	11,077	8.1	41
Corn	33	115	1,484	3,171	7.7	35
Prairie hay	79	333	7,541	5,096	4.4	65
Alfalfa hay	26	87	1,402	2,560	6.2	33
Green feed*	23	97	1,297	1,862	7.4	52
Corn and prairie hay	36	146	1,993	3,154	6.1	45
Corn and alfalfa	10	62	2,282	1,335	2.8	46
Corn and green feed	5	11	203	418	5.4	26
Prairie hay and green feed	13	38	578	1,185	6.5	32
Corn, prairie hay and green feed	6	27	185	236	14.5	114
Prairie hay and alfalfa hay	14	52	1,343	1,640	3.9	31
Alfalfa hay and green feed	6	33	331	567	9.9	58
Corn, alfalfa and green feed	2	4	57	160	7.0	25
Corn, prairie hay and alfalfa	5	24	192	260	12.5	92
Prairie hay, alfalfa and green feed	3	14	131	255	10.7	54
Corn, prairie hay and alfalfa and green feed	5	16	193	295	8.2	54

*This term is used to signify that the cattle were allowed to pasture on rape, wheat or rye in addition to cornstalks.

The results presented in the table show that there was a loss of approximately eighty-one per thousand head when fed nothing but cornstalks, and sixty per thousand when some other feed was fed in addition to cornstalks.

The loss is shown in Table II on a percentage basis for some of the common feeds fed in combination with cornstalks:

TABLE II

Feed in Addition to Cornstalks	Percent Killed	Acres per Animal
Prairie hay	4.42	0.67
Alfalfa	6.21	1.82
Green feed	7.41	1.44
Corn	7.73	2.10
Nothing	8.16	1.90
Corn, prairie hay and green feed	14.59	1.27
Prairie hay, alfalfa and green feed	7.02	1.95

From the evidence shown in the foregoing table it appears that there can be no definite conclusion concerning the poisonous nature of any combination of feeds or the fatal influence of a special feed when fed to animals together with cornstalks.

The Grain Sorghums Are Poisonous

Several cases of poisoning in the pasture have been investigated by members of the Station, and the symptoms of the stricken animals carefully observed. On one occasion a number of cows had fed for a few minutes on young kafir and young cane, the average plants being about ten inches high. Three of the animals died after being in the field about thirty minutes, and within two hours four others died. A few were slightly bloated and were not relieved when the rumen was punctured. One animal was saved without treatment. The symptoms of this animal were as follows: Lying on the ground with head turned into right side, frothing at the mouth, difficult breathing and dilated pupils; gradually the breathing became better and the head changed to a normal position. A postmortem examination showed nothing unusual except that the first stomach, the rumen, of each animal was full, and the contents were collected into compact mass. The field in which these animals had been feeding was examined for plants other than sorghums known to be poisonous, but none was found. The cane and kafir had a bitter taste resembling that of peach kernels. Peach kernels, peach leaves and the wild cherry are known to yield a very poisonous substance known as hydrocyanic or prussic acid. It is a powerful substance, and its action in producing death is usually extremely rapid.

Specimens of cane and kafir were collected in the field, which has been mentioned, and brought to this laboratory for analysis. Several other varieties of the sorghums have been analyzed, the results of which are presented in the next table:

TABLE III

Quantity of Hydrocyanic Acid in Sorghums Calculated as Potassium Cyanide

Description of Sample	Condition when Examined	Potassium Cyanide, Percent
Mature kafir, frostbitten	Dried	0.0240
Young cane, stunted and wilted	Dried	0.0300
Kafir leaves, normal plant 40 in. high	Fresh	0.0018
Kafir leaves, mature, frostbitten plant	Fresh	0.0037
Sudan grass, fall seeding, 10 in. high	Fresh	0.0035
Sudan grass, second growth, 15 in. high	Fresh	0.0042
Sudan grass, second growth, 17 in. high	Fresh	0.0021
Sudan grass, second growth, 30 in. high	Fresh	0.0042

Investigations have shown the presence of hydrocyanic acid in sorghums at various stages of growth. It appears that stunted plants, showing the need of rain, are especially dangerous. All young plants of the sorghum group are liable to contain the poison. The second growth and frosted plants have also been shown to be unsafe. The

specimens containing the larger amounts of poison were very bitter to the taste, and this characteristic may be used as a rough test.

If it becomes necessary to pasture stock on the sorghums which are at the dangerous stage, as mentioned, the animals should be allowed to remain but a few minutes at first, or the material tested by turning in an animal of little value, and if it refuses to feed you may be certain that the plants ar not safe.

Antidotes

The poison in cases of this nature acts so rapidly that the animals are usually dead when found, and, if not, they are so far gone that there is not time to administer an antidote. Sometimes there will be an opportunity to use a remedy, and the following have been suggested:

A large dose of some quick-acting purgative, such as a mixture of epsom salts and linseed oil. Dissolve the salts in water and give to the animal, then follow with the oil.

Large doses of cane syrup, molasses or glucose.

Inhalation of ammonia—household ammonia if strong will do—and the subcutaneous injection of ammonia. The latter would, of course, have to be given by a veterinarian or some other experienced person.

Mix 1 to 2 drams of magnesia to a smooth paste with water and pour down the animal's throat, then follow with 16 minims of a solution of iron chloride and 1.5 grains of ferrous-del-sulfate dissolved in water.

Peroxide of hydrogen, introduced by means of a stomach tube, has been used to an advantage. When this is administered, the stomach should be thoroughly flushed with water afterward.